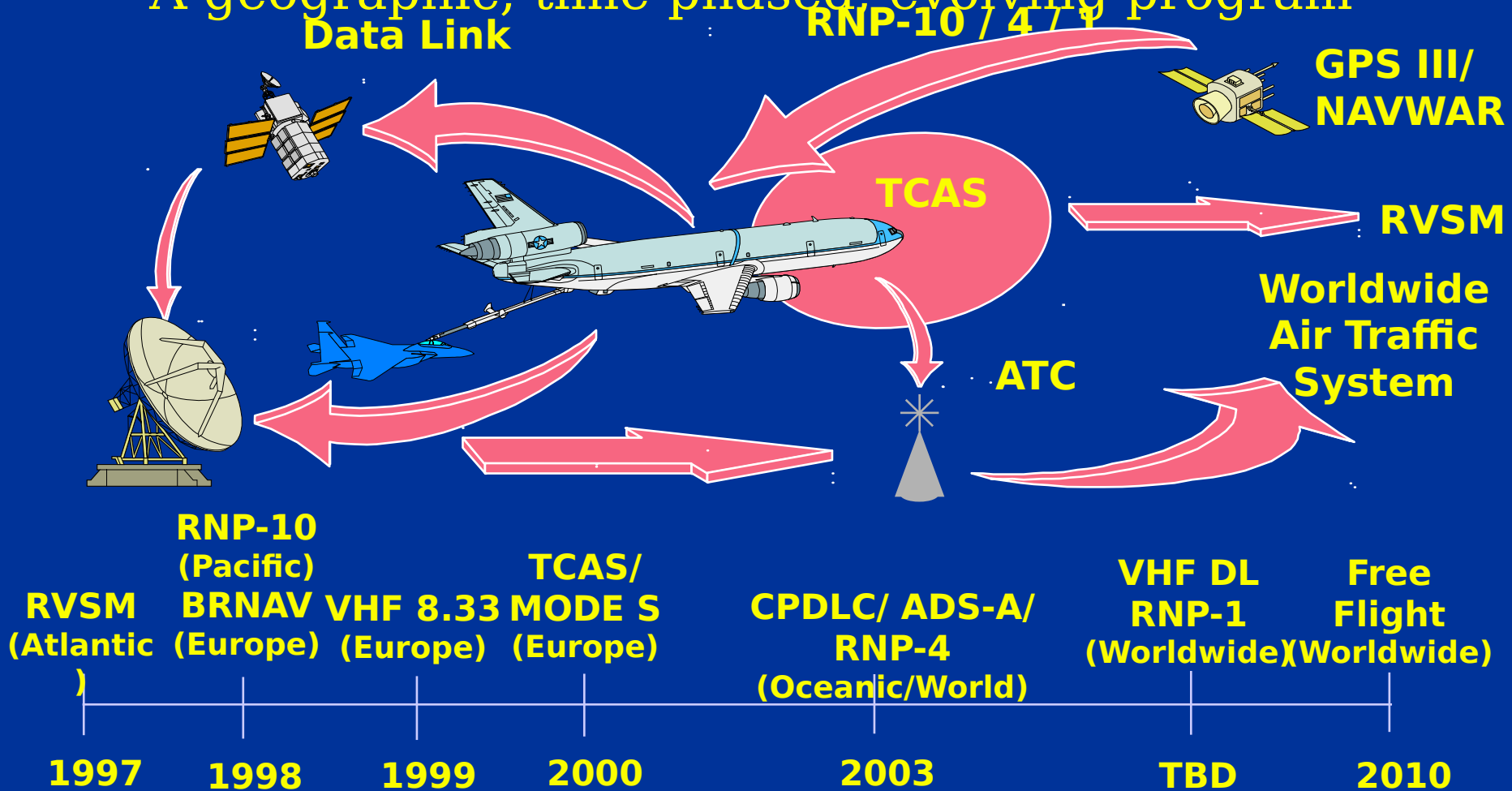


Global Air Traffic Operations/ Mobility Command & Control Update

Col Steve Henry
GATO/MC2 SPO Director
13 Oct 97

Scope of Global Air Traffic Management:

“A geographic, time-phased, evolving program”



USAF Fleet Composition Today and 2003

| Platform | <u>FY1997</u> | | <u>FY2003</u> | |
|----------------------|---------------|------------|---------------|-----|
| • Fighters | 2280 | 2145 | | |
| • Attack | 254 | 244 | | |
| • Bombers | | | 175 | 186 |
| • Airlifters | 1058 | 964 | | |
| • Tankers | 606 | 606 | | |
| • Recce/Surveillance | | 280 | 249 | |
| • Rotary Wing | | 216 | 221 | |
| • Trainers | 1238 | 1291 | | |
| • UAVs | <u>xxx</u> | <u>xxx</u> | | |
| • Total | 6312 | 6095 | | |

Global Access, Navigation, and Safety



GANS

- Global Positioning System (GPS) 2000 #
- Navigation & Safety Equipment *
- Joint Precision Approach and Landing System (JPALS) *
- Navigation Warfare (NAVWAR) #

- Global Air Traffic Management (GATM) *
- Avionics Modernization
- ATCALs / DATCALs *

* GATO / MC2 SPO Executing Agent
GPS / JPO Executing Agent

USAF ROM Cost for GANS Upgrades

| | | |
|----------------------------------|-----------|--------------|
| GPS 2000 (Nav / Safety & GATM) | | \$ |
| N/A | | |
| Nav / Safety (Total Program) | \$ | 1.6B |
| JPALS (Total Program) | \$ | 1.0B |
| NAVWAR (Funded RDT&E) | | \$ |
| .4B | | |
| ATCALS / DATCALS (Total Program) | \$ | 1.1B |
| GATM (Total Program) | <u>\$</u> | <u>11.4B</u> |
| Total Air Force Cost | | \$ |
| 15.5B | | |

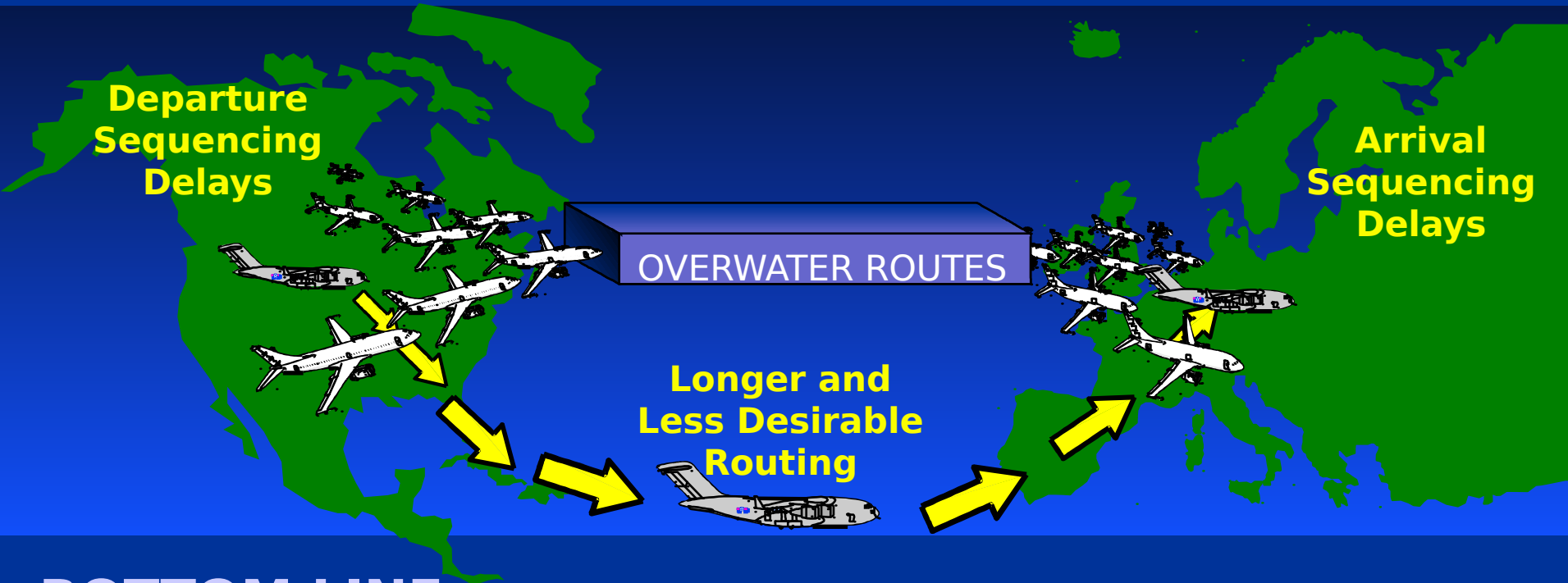
* Integrate GANS Requirements and Acquisition, When Able

* ~~Advise GANS Modernization~~ Existing Modernization or -
Programs

Impact Of Non-Compliance

- Business Case For Airline Expenditure Of Capital Is Partially Applicable
- Some Concepts Don't Carry Over Well
 - Military Operations Are Not Revenue Generating
 - Head-To-Head Competition Is Not Such A Factor
 - Cost Avoidance, However, Represents A Particular Concern For The Air Force

Impact of Noncompliance



BOTTOM LINE:

Noncompliance =

Longer Flight Times

More Fuel / Less Cargo

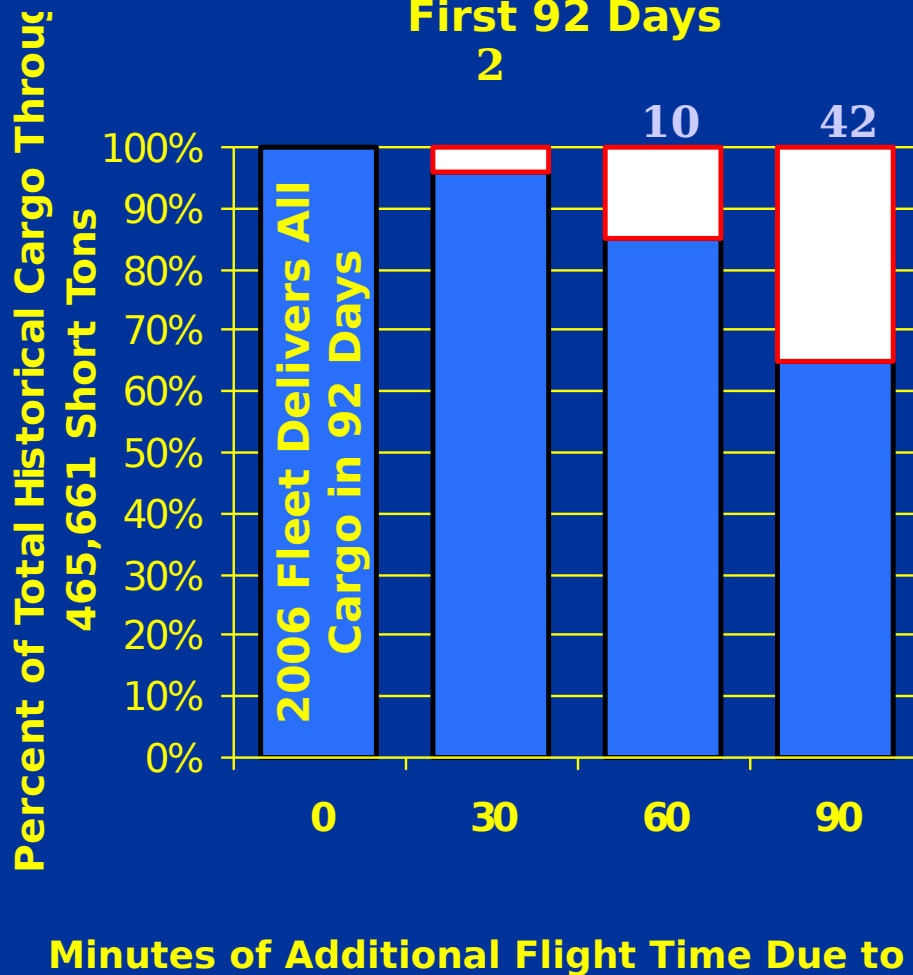
Additional Air Refueling

= Delayed Force Closure

Impact of Noncompliance: Airlift Capability

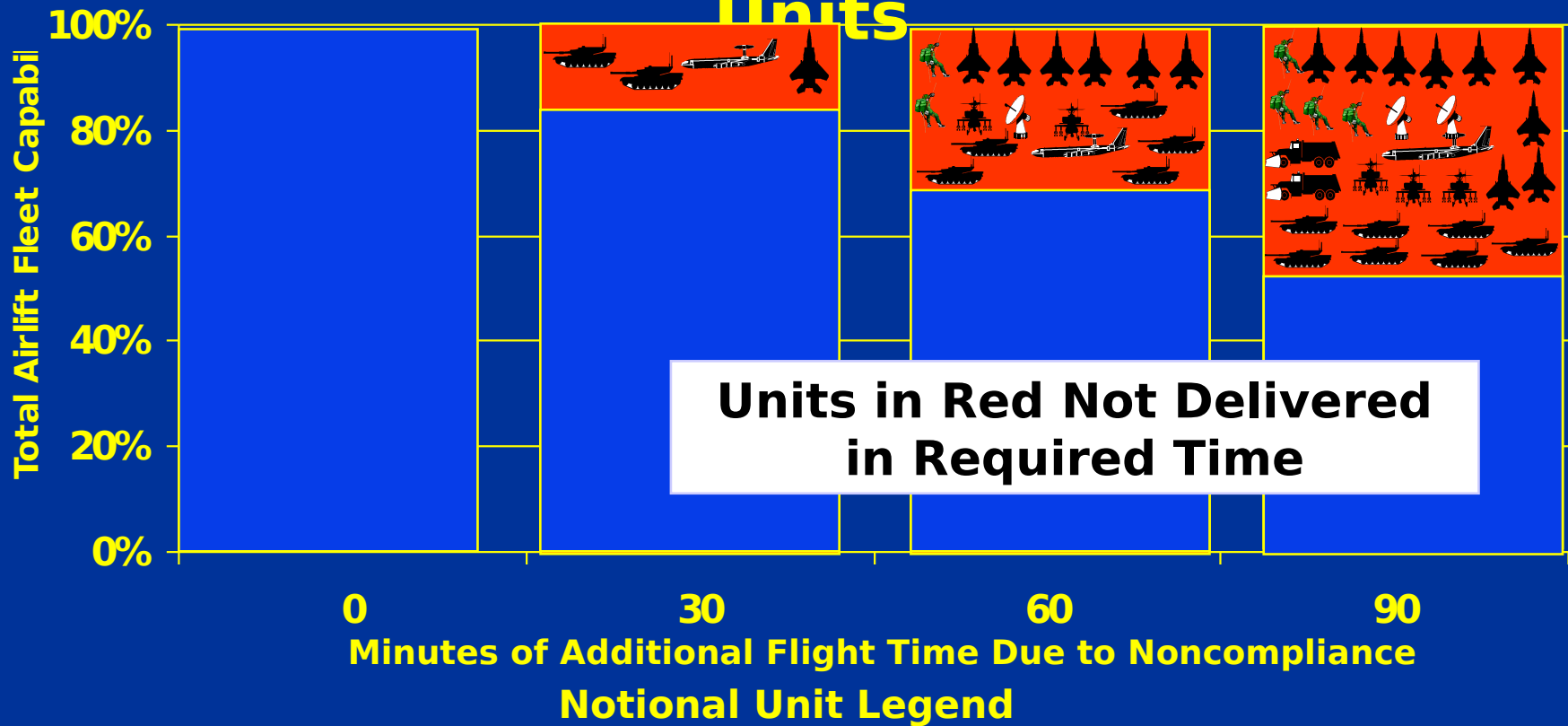
= Extra Days to Deliver Shortfall

Replay of DESERT SHIELD/STORM With 2006 Airlift Fleet First 92 Days

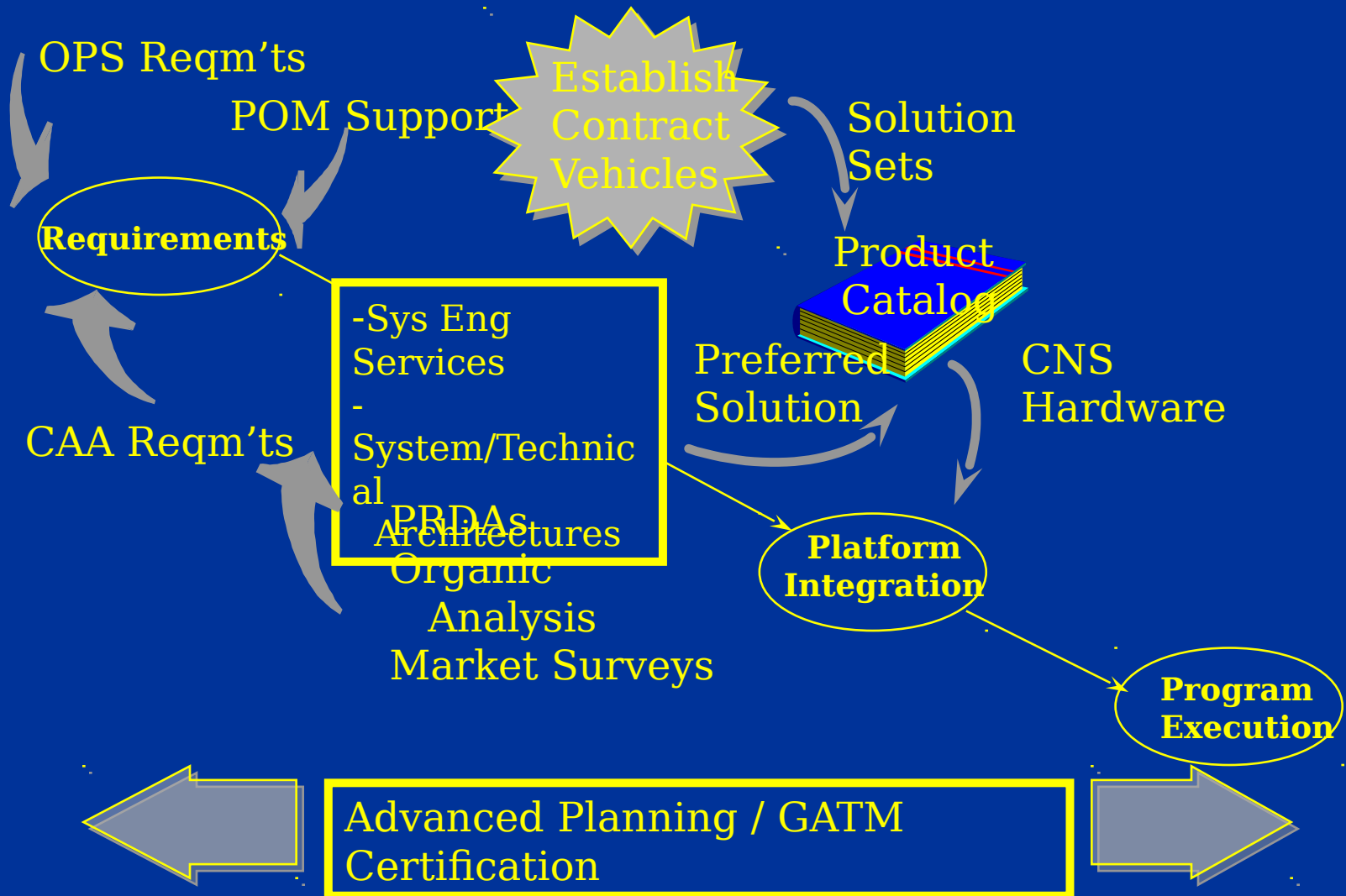


Assumes
Compliance
with CRAF

Impact of Noncompliance: Combat Units



GATO/MC2 SPO CONOPS



GATO/MC2 SPO Challenges

- Participate in FAA/ICAO Implementation Process
- Leverage Commercial Solutions While Maintaining Military Capabilities
- Orchestration Of Solutions/Timing/Funding Across Platforms
- Military/Civilian GPS Requirements

Shaping the Requirement

DOD Must Participate In Policy And Technical Standards Groups To Influence The Process

POLICY

- IPACG
- NATSPG*
- EANPG*
- FAA*
- NATO*

TECHNICAL

- AEEC
- RTCA

CIVIL AVIATION

- CNS/ATM Focus Team
- NDTA
- NBAA
- Oceanic Wkg Grp

* Through IGIA Coord Process

OBJECTIVE:
**Be Proactive To Lead Turn The
Requirements Process**

Acquisition Strategy

- Multiple ID/IQ Contracts
- Systems Engineering
 - Integration Support
 - Certification Support
- Logistics Concept - Commercial Practices
 - Contractor Support /Warranty

GATM + Mission Comm Reqt

| | MISSION REOTS | | | | GATM REOTS | | |
|--------|---------------|----|-----------------------|----|------------|--------|---------------|
| | HO | SG | UHF DAMA SATCOM | HF | 8.33 | ATC DL | OCEANIC DL |
| C-141 | B | NA | NA | B | NA | NA | NA |
| C-17 | B | G | G | B | G | R | Y |
| C-5 | B | Y | Y | B | Y | R | Y |
| KC-135 | B | NA | NA | G | Y | R | Y |
| KC-10 | B | NA | NA | B | Y | R | Y |
| C-137 | B | NA | NA | B | G | R | NA |
| C-9 | B | NA | NA | B | Y | R | Y |
| C-20 | B | NA | NA | NA | Y | R | Y |
| C-21 | B | NA | NA | B | R | R | Y |

| | |
|---|--------------|
| B | Complete |
| G | Funded Mod |
| Y | POM Input |
| R | No POM Input |

GPS RECEIVERS

CIVIL VS. MILITARY

MILITARY RECEIVER

- PPS: <10m accuracy
 - P(Y) code provides Anti-Spoof and removes SA
- Dual Frequencies -- L1/L2
 - Provides ionospheric error corrections
- Anti-Jam capabilities
 - Nulling antennas available
- No P(Y) Differential available
- 1553 Bus protocol
- Integrity only on some
 - Some PPS receivers

CIVIL RECEIVER

- **SPS: 50-100m accuracy**
 - C/A code only --
Degraded due to SA
- **Single Frequency -- L1 only**
 - No ionospheric error corrections
- **No Anti-Jam capability**
 - Fixed antennas and C/A code
- **Differential corrections to C/A**
- **ARINC 429 protocol**
- **Integrity (RAIM)**

Requirements Evolution

Today's GPS

- Project 2000
- Phase III Technology
- Parts Obsolescence
- Limited Upgradability

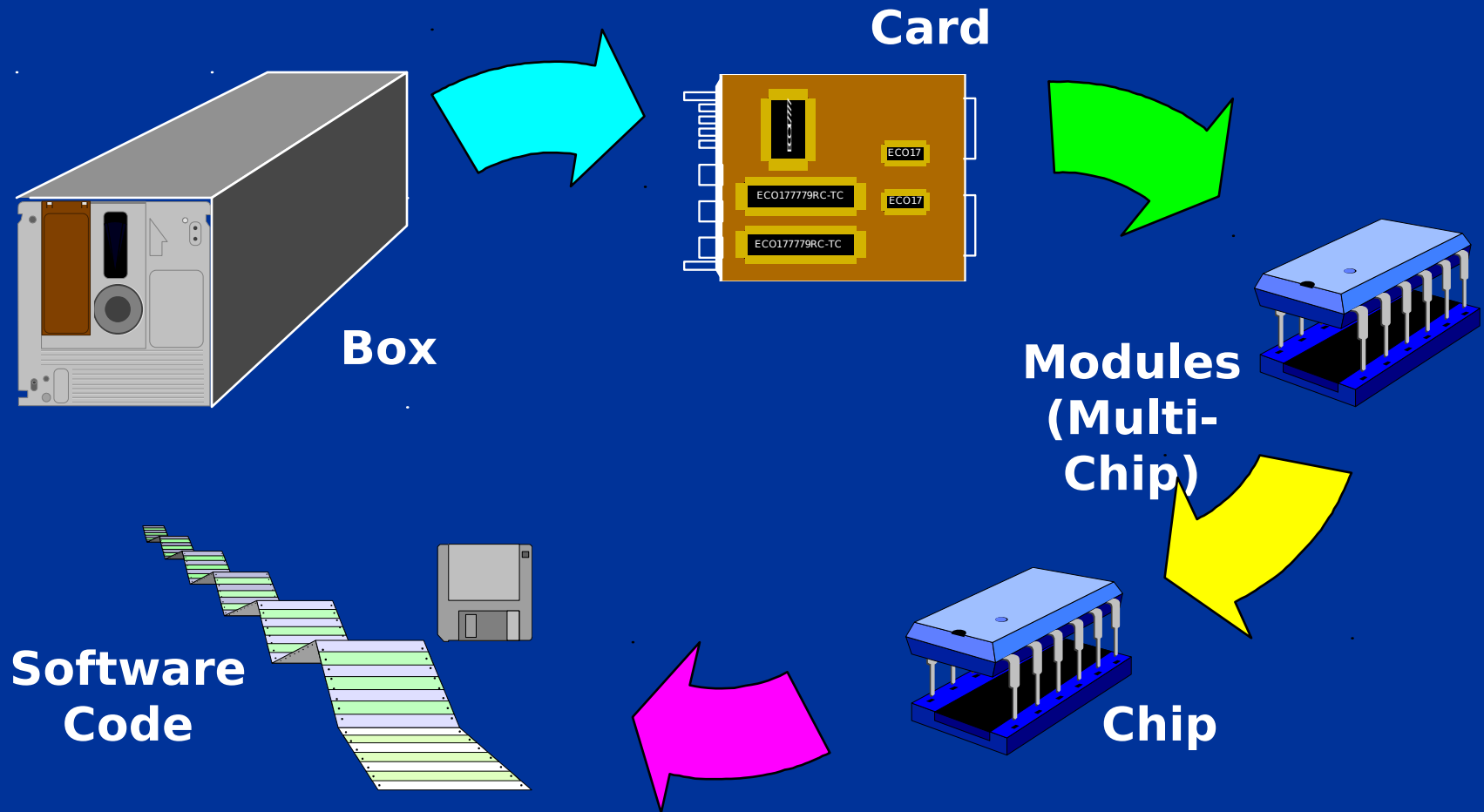
JPO-Advanced Technology Roadmap



Future Requirements

- GPS Modernization
- NAVWAR
- CNS/ATM
- PDD
- WAAS
- LAAS

GPS TECHNOLOGY TREND



GPS Receiver Application Module (GRAM)

- A military GPS receiver on a card that satisfies GRAM guidelines
 - Technical definitions
 - Minimum required functions
 - Performance metrics
 - I/O messages (ICD-153,155)
- GRAM may or may not include optional functions (Guideline appendices)
- GRAM will add any additional functions as necessary to satisfy user requirements

GRAM OSA for Military & Civil Receiver Upgrades

96

97

98

99

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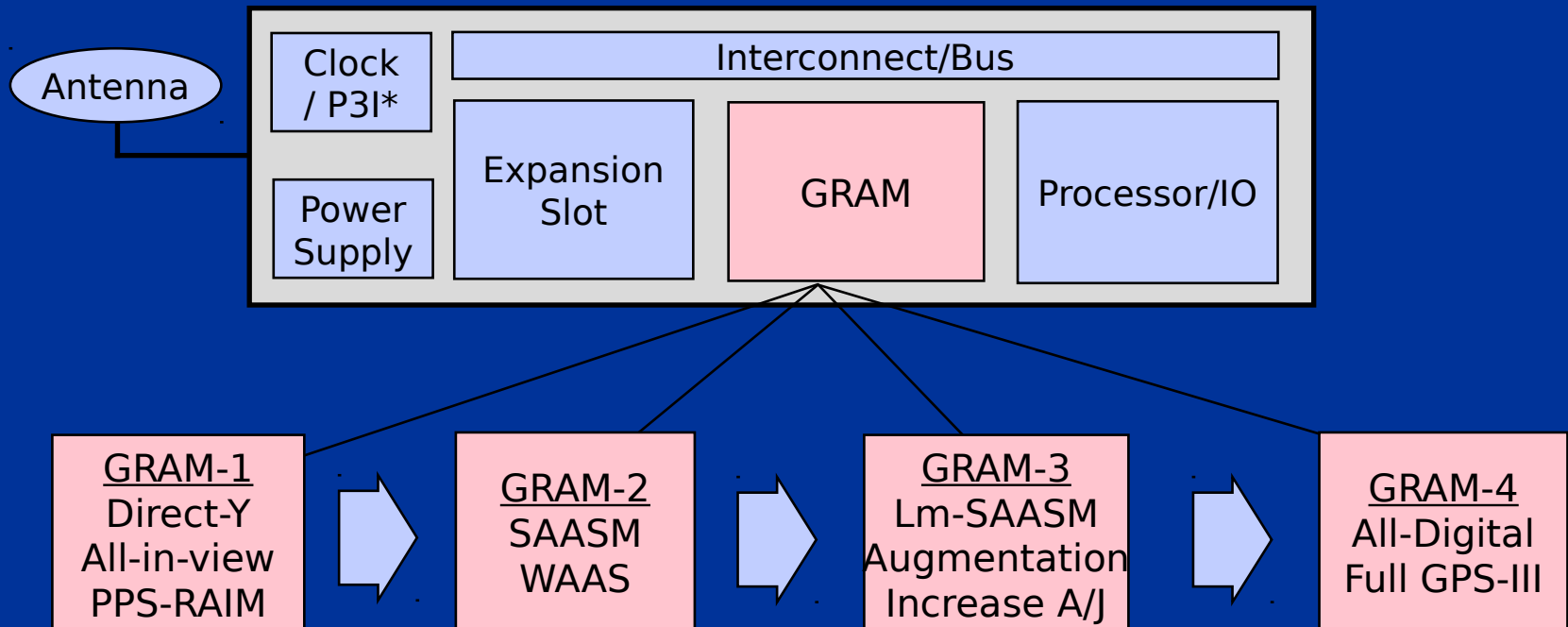
02

ACTD

PRODUCTION (MAGR FO & DOPPLER)

GPS 3 UE (MAGR, EGI, DOPPLER & WPNs)

CIVIL PROGRAMs



PROPOSAL: CIVIL USE OF GRAM OSA

- CIVIL GRAM = MIL GRAM - COMSEC
- Helps Both Military and Civil User
 - Ensures That Military UE Will Be Compatible in Civil Air Traffic
 - Increased Common UE Industrial Base
 - Civil & Military Test Savings; Common Test Plan
 - More Commercial Opportunity to Compete for Military UE
 - GRAM Guideline Will Include New GPS Modernization Structure

The Way Ahead

- Develop Air Force Master Plan
 - Requirements, Acquisition, Funding Strategies
- Influence FAA / ICAO Requirements Process Through Active participation
- Advocacy by Senior DoD Leaders / Congress
- Influence Various 1998-2000 Funding Opportunities
- Leverage Commercial solutions